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How Reliable Are Agricultural and Industrial Wage and Price Data?

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Reported agricultural wages are a highly reliable indicator of the direction and magnitude of actual monthly changes in both nominal and real movements in these wages, especially for the 3 large Provinces in Java. For Provinces outside Java reported annual changes are also highly reliable, but monthly and quarterly data can only be relied on beginning in 1998. **Industrial wages** reported quarterly by the Survei Upah Buru [SUB] **are quite reliable** beginning in 1994, but not before. They report wages for production workers below the level of foreman and technician, excluding technical and professional workers. But they do include wages of semi-skilled and skilled workers. The proportion of skilled workers differs among industries and regions, by gender and by size of plant. Over time all of these characteristics of the industrial labor force change. Therefore changes in the average wage for all industry is not a good measure of the changes in wages for unskilled workers. A better measure is the change in the median wages for particular industries whose workers are overwhelmingly unskilled. Near-final data are reported with a 12-month lag.

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HOW RELIABLE ARE AGRICULTURAL AND INDUSTRIAL WAGE AND PRICE DATA?

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PARTNERSHIP FOR ECONOMIC GROWTH (PEG)¹
BOSTON INSTITUTE FOR DEVELOPING ECONOMIES
GADJAH MADA UNIVERSITY – SIAGA Project
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A. SUMMARY

1. **Reported agricultural wages are a highly reliable indicator** of the direction and magnitude of actual monthly changes in both nominal and real movements in these wages, especially for the 3 large Provinces in Java. For Provinces outside Java reported annual changes are also highly reliable, but monthly and quarterly data can only be relied on beginning in 1998.
2. For Java sub-Provincial agricultural wage data are also quite reliable since there are some 160 observations for Central Java and more for the other two Provinces.
3. The principal weaknesses of these data are:
 - a. An unknown proportion of workers receive food in addition to their cash wage. The food component of the wage is not tracked or not tracked reliably. Since these payments in kind change less than cash wages, the reported changes somewhat exaggerate the changes actually taking place.
 - b. In some Provinces outside Java the sample is small and non-reporting reaches significant proportions
 - c. The consumption basket is not for farm workers but for larger farmers.
4. The strengths of the data include:
 - a. Wage and price data are collected from a large sample of nearly 800 kecamatan for wages and nearly 400 for prices for the 14 Provinces that are processed.
 - b. For Java and increasingly for Provinces outside Java non-reporting is less than 5% and non-justified non-reporting is substantially less than that.
 - c. Reported prices are collected from the same or neighboring kecamatan as the wage data. Nearly 300 different prices are collected, adjusted for quality with respect to such items as rice. They are therefore highly reliable as an indication of the cost of consumer items.
 - d. Final data are available from BPS within 3 months of collection.
5. **Industrial wages** reported quarterly by the Survei Upah Buru [SUB] **are quite reliable** beginning in 1994, but not before. They report wages for production workers below the level of foreman and technician, excluding technical and professional workers. But they do include wages of semi-skilled and skilled workers. The proportion of skilled workers differs among industries and regions, by gender and by size of plant. Over time all of these characteristics of the industrial labor force change. Therefore changes in the average wage for all industry is not a good measure of the changes in wages for unskilled workers. A better measure is the change in the median wages for particular industries whose workers are overwhelmingly unskilled. Near-final data are reported with a 12-month lag.
6. Confidence in the reliability of both data series is enhanced by their consistency with other developments in the economy and their correlation with each other.

B. HOW “RELIABLE” ARE AGRICULTURAL WAGE AND PRICE DATA?

Gustav F. Papanek, PEG/BIDE, & Budiono Sri Handoko, SIAGA/UGM¹

In another paper in this series it has been argued that wage data can be used to provide early warning of declining incomes for the poor and to guide policy and program measures to alleviate the problem. Of course, wage data can be used for this purpose only if they indicate changes in income with some degree of reliability. Questions have, in fact, been raised about the “reliability” of these data. Elsewhere we have acknowledged that wage data are less rich and comprehensive than the data derived from household income and expenditure surveys. But we have also argued that wage series provide some information on what happened to the income of the poor far more promptly than household data and that they are therefore an indispensable tool to quickly detect deterioration in the economic situation of the poor and to guide remedial measures. If remedial policy and programs have to await data from household surveys it is usually too late to do anything for the poor – the crisis may well be past before it is detected.

But wage data can be used for early detection and remediation only if the reported data reflect reality with some degree of accuracy. Agricultural wage data have been little used for policy formulation and program design because they are widely thought not to be reliable in reflecting changes in wages or prices. This paper therefore addresses the reliability of the wage and price data derived from the monthly series on Farmers’ Terms of Trade [Nilai Tukar Petani -NTP].

Coverage and Sample Size

Data have been collected by the BPS [Badan Pusat Statistik –Central Bureau of Statistics] for the 4 Provinces of Java [excluding Jakarta] since 1976 and are available beginning in that year. In 1987 an additional 10 Provinces were added, but these data are available only beginning in December 1991 [or 1993 in some cases]. Since 1993 a total of 23 Provinces report, but only the first 14 have been compiled and are available. Data are reported monthly and reach BPS with a lag of less than 2 months and are published within 3 months.

Production data, both inputs and outputs, are collected on 5 different schedules for rice and other food crop agriculture; livestock; forestry; fisheries; and small-holder plantation crops [tea, coffee, rubber, etc.]. The only data published are for rice and other food crop agriculture and this note deals exclusively with information contained on that particular interview schedule. The focus is on rice agriculture, with relatively standardized labor requirements.

For the 23 Provinces for which data are now collected some 924 reports were received in 1998 and for the 14 Provinces actually compiled and available there were 797 reports. Each report is from a sub-regency or kecamatan and provides information on wages paid and prices paid for consumer goods and services. The sample is therefore

¹ We gratefully acknowledge the kind assistance of senior BPS staff, most notably Dr. Ali Rosidi, Director Bureau for Price and Financial Statistics; Alimuddin Sidabalok, Head Department SHP & KP and Bagus Rahmat of that Department. Kai Kaiser, who has worked with these data, provided very useful guidance.

fairly large and should be quite representative. It is not completely random. The regencies [kabupaten] selected are those where agriculture is important [“agricultural production centers”] and similarly for the kecamatan [sub-regencies]. But there is no reason to think this produces a serious bias problem. It is clear from interviews with 6 Statistical Officers [Mantri Statistik] in Java that the sample includes both wealthy and poor kecamatan, some that produce primarily rice and others that produce vegetables, some that are near cities and some that are further away. At least three farmers are to be interviewed in each kecamatan, with their names and locations recorded on the questionnaire. The “most representative” wage or price is to be reported. In theory therefore over 2000 respondents are reported. An earlier study of wage data reported that a particularly eager Officer claimed to have interviewed 14 farmers². But it is likely that at least some Officers interview only a single farmer. But as long as wages are uniform in each village in each month the number interviewed does not matter much. Uniformity of wages is logical in a normal labor market and is reported by all Mantri Statistik and the farmer interviewed. Similarly 3 traders are to be interviewed for retail price data, but here too only one is interviewed in some cases.

Data are collected from larger retailers in the headquarters market of each kecamatan for the Consumer Price Index [CPI] and from farmers with larger holdings for the cost of inputs, including wages. While the sample is biased towards larger farmers, who can provide information for a greater range of input and output prices there is no reason to think that this introduces a significant bias. In reasonably well functioning labor markets one can assume that all farmers pay roughly the same wage for the same operation [hoeing, transplanting/planting and weeding] by essentially unskilled farm workers. Statistical Officers unanimously said that wages are uniform within the same village for the same task. Similarly there is unlikely to be much of a bias as a result of obtaining prices from larger retailers in a particular market.

The Problem of Defining the “Daily Wage”

It is a well known that in collecting wage data there are problems in standardizing for labor quality, location, length and timing of work and compensation package. Labor quality is less of a problem in the agricultural wage than in industry or services. Hoeing, weeding and planting are relatively standardized tasks; the skills required are modest and little affected by education or training. Changes in the location of reporting units is not a serious problem since reports are always received from the same kecamatan and generally from the same villages and informants. There is some seasonality in the work, so that some kecamatan will not report hoeing or planting work in some months. But since rice agriculture in large parts of Indonesia is a year around affair this is less of a problem than in most other countries. Timing of work is also not a serious problem: work is widely started early in the morning and is never done at night.

The standard day. BPS has also standardized the workday at 5 hours and the compensation package for cash wages only. But interviews with Mantri Statistik indicate

² Korns, Alex “Wage Data at BPS” DSP # 22, April 1988. This unpublished paper by the Development Studies Project II is a highly useful source of data on wages

that neither is universally observed³. Among the 6 Officers interviewed one reported that the standard day was from 7 am to 4 pm, or 9 hours. However since 2 meals were provided during this time the actual hours worked were probably something between 7 and 8. On the other hand another Officer reported that a working day was only 3-3.5 hours. A third reported that pay was per shift, which lasted only 2 hours. But he reported a day as having 6 hours and three shifts with pay three times that for one shift. Another said the working day was 4 hours. The three Officers reporting 3, 4 and 5 hours respectively were all in the same Kabupaten, but in different Kecamatan. It therefore appears that Mantri Statistik report the definition of a day customary in their Kecamatan and do not attempt to standardize to a 5 hour day. Wages are therefore not necessarily comparable among kecamatan or Provinces. However, since each Mantri uses the customary definition of a day for his kecamatan consistently month after month the wages series over time are quite consistent.

Payment in kind. The treatment of payment in kind is somewhat more consistent from one kecamatan to the next. For work on all cash crops, such as vegetables, all Officers reported that no payments in kind were received. The cash wage represented the total wage. However, for rice agriculture some payment in kind was not unusual. In several areas women participating in harvesting were compensated by receiving a share of the harvest. In some cases these women had also worked on weeding or transplanting and had received no cash payment for that work either. However, since BPS no longer reports the harvesting wage it avoided the problems of valuing these payments in kind.

More problematic is the widespread custom in rice agriculture of supplementing the cash wage with payment in the form of food. Again the food package available differed from kecamatan to kecamatan. In the area where a shift was 2 hours no food was received while in the one where the day was as much as 9 hours two meals were provided. One of these meals was quite elaborate. Moreover, while most Statistical Officers reported only the cash wage paid, as instructed by BPS, at least one out of 6 also included his estimate of the value of the food provided in the wage reported⁴.

Again, any attempt to compare wages received in one region with that in another would be bedeviled by differences in the quantity and quality of the food received and, in a few cases, by inclusion of the value of the food in the reported wage. But payment in kind also reduces the reliability of comparisons over time. If the payment in kind remains unchanged over time it will tend to dampen major changes in the cash wage. If one assumes that in the base period the value of the food received is equal to 20% of the cash wage, when the cash wage rises 10% then the same quantity of food will now be equal only to 18% of the cash wage [20/110]. The total wage, cash and food will not have risen 10% but only 8.3% [10/120]. Conversely if cash wages fall, but the food package remains unchanged in value then the fall in the total wage will be dampened.

But if a rise in the real wage is in part due to a fall in food prices then the dampening effect of the payment in food will be even greater and similarly for fall in real wages due

³ Both authors interviewed one Mantri in Yogyakarta Province, Kabupaten Sleman and 4 Mantri in Central Java, Kabupaten Magelang. Papanek interviewed the sixth Mantri with a SIAGA Assistant in West Java, Kabupaten Bogor and also interviewed one of the farmer informants there.

⁴ For Cirebon Alex Korns [op.cit.] also reports that an estimate for the cost of food supplied was included in the wage data.

to a rise in food prices. This can be illustrated by the decline in real wages during the crisis. In the summer of 1997 assume that cash wages were 100 and food received had a value of 20, so total wages were 120. A year later real cash wages had fallen by 40% to 60. The same food was received but had now doubled in price and therefore had a value of 40. The total wage was therefore 100 [60 in cash and a value of 40 in kind]. The total wage had fallen only 17% [a decline of 20 from a base of 120], while the reported cash wage had declined 40% [from 100 to 60]. Changes in the cash wage, which are what is generally reported, therefore overstate the actual changes in the total wages for many workers in rice agriculture.

Do Payments in Kind Undermine the Reliability of the Wage Data?

There is no doubt that the widespread use of payment in kind reduces the reliability of the reported agricultural wage data, which primarily reflects cash wages and largely ignores these payments in kind. Since some statistical officers do include the food provided in the reported wage, while most seem not to, consistence across regions is lacking. But Officers are consistent in their reporting over time, so the changes are reported consistently. However failure to value food received does overstate changes in wages over time. Nevertheless, the data do provide a useful and reasonably reliable index of such changes for a number of reasons:

[a] It appears that only workers in rice agriculture, and not all of those, are given food in addition to a cash wage. For a large proportion of workers – how large we do not know – the cash wage is the total wage. For them the reported wage accurately reflects the changes that have taken place.

[b] Workers paid largely or wholly in kind seem not to be reported in the NTP survey. By interviewing farmers with larger land holdings the Statistical Officers automatically obtain information from more commercial operators. They operate primarily in a commercial labor market where the cash wage is dominant. Small-holders may obtain labor in an exchange agreement with other small-holders where there is no cash wage involved or payment in kind is dominant, but these cultivators are not in the sample for the NTP survey

[c] The meals provided in addition to the cash wage seem to vary in the same direction, though probably not in the same magnitude, as the cash wage. One Statistical Officer explained that in response to the recent economic crisis cultivators in his area had eliminated free cigarettes from the meal provided, had changed from fish or meat to dried fish and had reduced the quality, though not the quantity, of rice. To the extent that payment in kind moves up or down with cash wages no error is introduced in the real wage calculations by the fact that payments in kind are not recorded.

For all 3 reasons changes in the reported wage, essentially the cash wage only, seem to reflect reasonably well the changes in total compensation. This conclusion is supported by an analysis of wage differences among Provinces and, above all, the changes over time. Differences among Provinces are quite consistent with general economic information. In the pre-crisis year of 1996 agricultural wages in West and East Java were quite similar around Rp. 3,000 per day [Table 1]. Central Java was substantially lower at about Rp. 2,100/ day. This is quite consistent with the per capita Gross Domestic Provincial Product, which is similar in West and in East Java and significantly lower in Central Java. Lampung, with substantial migration from Java and

little industrial employment, had wages and per capita incomes close to those for Central Java. North Sumatra with richer resources and an industrial base in Medan had wages close to those of West/East Java, but it had a higher per capita income than any part of Java. The small discrepancy can be explained by the fact that some of North Sumatra's income is generated in activities creating little demand for labor, including oil/ gas and timber production. Bali, heavily reliant on labor-intensive agriculture and the tourist and garment industries, has wages for agricultural labor, which are among the highest in Indonesia. Its per capita income is also among the highest. South Kalimantan actually has somewhat lower wages than Bali, although its per capita income is substantially higher. Again the explanation lies in the capital-intensive nature of most Kalimantan activities, creating less demand for relatively unskilled labor, in sharp contrast to Bali's labor intensive activities. In short, while there is considerable noise in the level of wages reported from different areas, in part because of differences in payments in kind, wage levels are broadly consistent with what is known about incomes and labor intensity of difference Provinces. This increases one's confidence in the reliability of the wage data.

Table 1
Nominal Wages and Gross Product of Selected Provinces, 1996

	Wages – Rp. 000 per day	Gross Provincial Product per capita, Rp. Million per year
West Java	3.0	1.7
Central Java	2.1	1.4
East Java	2.9	1.8
Lampung	2.2	1.4
North Sumatra	2.9	2.5
Bali	3.6	3.0
South Kalimantan	3.5	4.1

Sources: Gross Regional Domestic Product for 1996 from "Statistical Yearbook of Indonesia, 1998" and population for 1995 from the same source.

Changes in agricultural wages over time are even more consistent than spatial changes with what is known about changes in economic circumstances. The paper,⁵ which analyzes the impact on real wages of economic growth and decline, provides examples of econometric analyses which quite reliably related changes in real wages to changes in the rate of inflation and the demand for labor. Changes in agricultural and industrial wages are also closely related in econometric analysis. These wage series are collected quite independently, and use different definitions and samples. Industrial wages are not affected significantly by payments in kind. Their correlation increases confidence in the reliability of both series. In short, reported changes in wages undoubtedly overstate the extent to which they have changed, because they do not take account of the fact that some workers receive food in addition to the cash wage. Since the value of food provided almost certainly changes less than the nominal cash wage, indeed it may change

⁵ Papanek and Budiono Handoko "The Impact ...", op.cit.

in the opposite direction, changes in the index of nominal and real agricultural wages from the NTP data overstate the extent of movement. But since many workers receive only a cash wage and for other reasons the data correctly indicate the direction of change and the rough order of magnitude. For instance, if real wages in Java are shown in these data to have declined by 10-15% in 1986 to 1988 and by over 40% in 1997 to 1998, it could be that the real declines were really of the order of 8-10% in the first case and 30-35% in the second. But there would be little doubt that the recent decline was far more drastic than the one a decade earlier.

Evidence on Data Collection

Wage data for Java seem to be collected quite carefully. During the recent crisis monthly nominal wages changed very much as one would expect: as inflation accelerated so did the increase in the nominal wage, but at a slower rate. Printouts of the data also showed that failure to respond was very low: about 5% of the reporting kecamatan failed to report wages in January of 1998, for instance. Some of these non-reporting areas can not report because no covered operations are carried out. The area may grow seasonal crops and no hoeing, planting/ transplanting or weeding may go on during a particular month. So true failure to report is less than 5%. The reporting rate is therefore as high as can be expected. It justifies considerable confidence in the resulting data. Reporting is prompt: generally within two weeks of the interview, according to Statistical Officers. Reasonable data cleaning is carried out to assure that obvious data entry or copying errors are eliminated before Provincial averages are calculated [e.g., where a decimal point has been shifted or a zero added so that daily wages appear as Rp. 13,000 rather than Rp. 1,300].

Since kecamatan data may be based on a single observation they may not be very reliable. There is simply too much chance for noise in any single observation: estimation substituting for actual data because the operation was not carried out in the village during that month, for instance. Kabupaten data, based on observations in 3 different kecamatan should be fairly reliable and Province-wide data in Java with 60-90 observations each would be reliable. Regional data for Java, covering several kabupaten, would also be reliable.

For non-Java Provinces the reliability of wage data is somewhat less. No interviews were carried out by us in these Provinces because of limited time and funds. But the raw data show identical wages for 4-6 months in a row through 1996/97 for nearly all non-Java Provinces⁶. That is quite implausible. In a particular kecamatan it is possible that nominal wages do not change every month. Indeed it is plausible that they remain constant for a whole crop cycle. But the average reported for each Province covers at least 9 kecamatan, generally with somewhat different crop cycles. It is implausible that in every one of them the nominal wage remains unchanged for 4-6 months so that the average remains constant also. More likely is that Statistical Officers only reported quarterly or semi-annually and that the Province preferred to report an unchanged wage rather than not reporting at all for that month. This problem exists for non-Java Provinces through 1997. However, as inflation accelerated in late 1997 and in 1998 the majority of these Provinces also began to track nominal wages more closely or

⁶ The near-exception is North Sumatra. Beginning in 1994, and except for 3 months in 1996, that Province reports different nominal wages every month.

made other changes in their method of collecting wage data. As a result most Provinces reported increased nominal wages every month for the more recent period⁷. It appears that this problem is on its way to a solution in 1998/99. But for earlier years for non-Java Provinces only semi-annual or annual changes in wages can be assumed to reflect reality.

For many of these Provinces the percent of non-reporting areas is also higher than in Java. Bali's non-reporting rate is an exception: it is below 5% in both January and December 1998. But in other Provinces non-reporting rates of around 15-35% are not uncommon in both January and December 1998. Failure to report can, of course, be quite legitimate, especially in non-irrigated area if there are no cropping operations and no labor is hired in the particular kecamatan in that month. For a Province as a whole it is possible that a substantial number of kecamatan have no hired labor to report.

In that case a third problem can arise for these Provinces. The sample size is often quite small, some 17 to 30 kecamatan reporting, as contrasted with 155 in West Java. The average for the Province then can be affected by the particular kecamatan which report that month. If those reporting are mostly from a lower wage area and during the off season they will report a low wage. If 6 months later the reporting sample is drawn mainly from a high wage area reporting during harvest time, then an increase in the wage may be shown. But it would be statistical artifact. Such artifact is especially likely in Provinces that grow some high value crops with high labor demand, like some kind of vegetables, and some low value crops with low labor demand like maize.

There are then 3 reasons why wage data for most of the non-Java Provinces are less reliable than for Java:

- [i] There is a higher proportion of non-reporting kecamatan;
- [ii] There is a greater tendency to report the same nominal wage for several months in a row for whole Provinces, partly due to smaller sample size and probably to less careful reporting;
- [iii] Because of smaller sample size and greater variability in the crops grown and therefore in labor compensation, changes in the identity of reporting kecamatan can result in spurious changes in nominal wages.

In addition the time series for these Provinces begin only in 1992. Statistical analysis is therefore not possible.

But over time these data have become more reliable as well. By 1998 the data for nearly all Provinces in Sumatra and for Bali were being reported for nearly all months. As expected, reported nominal wages moved upwards with prices on a Province-wide basis. The non-Java Provincial wage data were therefore quite reliable in assessing what happened to agricultural labor during the current economic crisis.

The price data used to deflate wages are a real strength of these wage series. In the 14 Provinces for which wage data are available prices are collected in nearly 400 kecamatan. That is almost ten times as many markets as those for which the urban consumer price index is available. For every 2 observations or kecamatan for which wage data are available there are price data. In short, the wages are deflated by an index

⁷ Only South Sumatra reported identical nominal wages for 4 months in 1998. The other 4 Sumatra Provinces were more credible in reporting changes every month. So did Bali and NTB. Even in 1998 South Kalimantan and both reporting Provinces in Sulawesi still reported identical nominal wages for 2-5 months.

which is highly specific and which tracks price changes in the very same area, half the time in the same kecamatan, in which nominal wage data are collected. This is important for reliability of the data since World Bank studies have shown significant price disparities in different regions of Indonesia. Moreover there are great differences in the consumption pattern for different rural areas. Differences in consumption basket are even greater between rural and urban areas. Using the urban CPI to deflate rural wages, which has often been done in the past and even recently, can lead to seriously wrong conclusions. Real wages derived from NTP/Farmers' Terms of Trade data are more reflective of true purchasing power since the deflator uses rural and Province-specific consumption baskets and Kabupaten-specific prices

Prices are collected in considerable detail: for nearly 300 goods and services, and for different kinds and qualities of important goods [e.g., there is space for over 20 different varieties and qualities of rice, including the country of origin for imported rice]. Weighting is from the SUSENAS household survey and therefore quite accurate. There are some significant weaknesses: the most serious is that for Java the weights used are for 1983 [?] while for other Provinces the 1993 weighting is used. The Java indexes are also available, but not published with 1993 weights. Using 1993 weights would be more appropriate for deflating recent wage data than the 1983 weighting actually used. Another problem with the price data is that weighting is at the Provincial level, although prices are collected at the kecamatan level. By ignoring differences among regions of large Provinces the uniform weights introduce a minor amount of noise. Despite these problems the large sample of the consumer price index used to deflate the agricultural wages assures a high degree of confidence for the real wage calculation.

C. HOW “RELIABLE” ARE INDUSTRIAL WAGE AND PRICE DATA?

Gustav F. Papanek PEG/BIDE

The Quarterly Survey of Industrial Wages – Definitional and Compositional Problems

The other data that can be used to provide early warning of changes in the real wages, and therefore incomes, of the poor are nominal wages from the quarterly industrial wage survey, the Survei Upah Buruh or SUB. These data have been collected since 1981. No significant noise is introduced into this series by payments in kind. Wages are largely or wholly in cash. However the industrial wage data suffer from problems of consistency and composition.

Wages reported for crop agriculture are overwhelmingly those of unskilled workers with clearly defined jobs. There are no great problems in defining what task is involved in “weeding”. But in industry there are great differences in skill and training levels, and consequently in compensation. A “weaver” can be someone with low skills who tends a single simple loom. The same designation can be given to someone who is responsible for four, highly automated and sophisticated looms, each worth 5-10 times the value of the simple un-automated one. Wages for the two “weavers” will be quite different. If weavers wages reported in the early 1980s are mostly for the low-skill end of this job and those reported for the 1990s are mostly for the higher-skilled workers then there will be a sharp increase in wages, which is statistical artifact.

The problem is even more serious if reported wages are for whole industries or groups of industries. If food processing, for instance, in the initial period reports mostly workers in very simple, labor intensive tea curing and packing, wages will be low. If subsequently most firms in the industry run automated canning units then wages will be higher and the wage for “food processing” will have rise. But the rise will, of course, simply reflects a change in the skill and training of workers, not a real increase in the wage of the same workers. Within the same industry wages also differ by size of firm. For most individual industries the difference between medium-scale and large firms is one-fifth to one-third. The differences in pay will be even greater for all of industry. Workers in the cigarette industry received a weekly wage of Rp 29 thousand in March 1996 while the wage in “other textiles” was three times that during the same period. Again, if high wage industries expand more rapidly than low wage industries the result will be a spurious increase in wages. Using average wages for all industry as an indication of what happened to the wages for particular workers over time is therefore dangerous and can lead to serious error.

There is one further problem in tracking the income of the poor. That requires data for unskilled workers. Skilled workers are not among the poor, while technical and professional staff in industry is well within the middle class. The average wage in some industries [e.g., many chemicals; steel production; aircraft manufacturing] is heavily weighted towards the wages for these groups. In other industries there are firms that are highly automated and employ mostly skilled and technical labor [e.g., the production of “white” cigarettes or automated weaving] while other firms employ a lot of unskilled labor [clove cigarettes or garments]. If the reporting universe during one quarter has

more of the automated firms while in another quarter mostly labor intensive firms report then the wage will appear to have fallen, even if it has risen for the same workers.

Because of definitional and compositional problems the SUB was considered an unreliable source of data on the wages of unskilled workers during the 1980s⁸. But beginning in 1994 wages were reported separately for production workers below the level of foreman and technician. The bulk of the workers in this category were unskilled or semi-skilled. There is still noise in the data if one is concerned with wages of unskilled workers since skilled production workers are also included. One can largely deal with this problem by concentrating on industries that employ primarily unskilled workers. Compositional shifts are less of a problem since 1994 since industry was no longer growing as rapidly as it had in earlier periods. They were also less because in the recent past the composition of the manufacturing sector was no longer changing as rapidly as earlier. In the 1970s and 1980s such industries as weaving, artificial fiber production, fertilizer and cement production, shoes, garments, and electronics during different periods went from negligible production to major exporters. For all these reasons the consensus is that SUB data can be used to track changes in wages beginning in 1994.

Sample Size, Data Collection and Reporting

In 1998 wage data were collected from a fixed sample of 1009 large and medium-sized firms. By July of 1999 the statistics for the first quarter of 1998, the period April-June 1998, were considered quite firm since 930 firms had reported, well over 90% of the sample. For the second quarter of 1998 [July-September] the number of firms reporting also exceeded 90%. But only 60% of sample firms had reported their fourth quarter 1998 data by July 1999 so reported wages would, at best, be considered highly preliminary and subject to considerable change as more firms reported. So the lag for preliminary data is 6 months and for near-final data it is 12 months [after 9 months over 80% of the sample has reported]. These series are therefore not nearly as good as the agricultural wage series for tracking what is happening, since the delay for agriculture is only 3 months for final data.

The most consistent time series would be to track either large or medium-sized firms in one industry and in one region, preferably separately for men and women, since wages differ by all these categories. But the sample is not large enough to permit this and the data are not currently available in this disaggregated form. The best approximation is to track industries that employ primarily relatively unskilled labor with little change over time in technology, location or size of firm. If the industry also employs primarily men or women then there is likely to be little change in those characteristics of labor which affect wages. An example of such as industry is cigarette manufacturing, employing mostly women, concentrated in Central Java and with the bulk of workers employed in large, low technology factories. "Bricks and tiles" employs largely men, in widely scattered and small enterprises, generally also with low technology.

The logical price deflator for these wages is the urban consumer price index [CPI] available for 44 cities in Indonesia. No Provincial averages are constructed for those Provinces with more than one city for which the CPI exists. Since most industrial firms are located in the Provincial capital it is logical to use the CPI for that city to deflate Provincial wages. There are many Provinces outside Java for which no separate

⁸ See Korns op.cit. for the status as of 1988, updated by personal communication from Alex Korns.

industrial wage data are reported because there are simply too few reporting firms in each Province to justify calculating an average wage. For the island of Sumatra, for instance wages are reported separately for North Sumatra with 68 reporting firms. But the remaining 6 Provinces in Sumatra have only 70 reporting firms among them. Wage data for these 6 Provinces are aggregated as “other Sumatra”. All of Sulawesi, with 17 reporting firms is also aggregated with only a single average wage reported. In these cases the CPI for the Provincial capital with the largest concentration of reporting firms was used.

In short, industrial wages are less suitable for tracking the income of the poor than agricultural wages. First, industrial wages are available with a 6-12 month lag, compared to 3 months for agricultural wages. Second, problems of definition and composition dog the nominal wages reported for industry. Above all reported wages are averages for unskilled, semi-skilled and skilled workers in industry, while in crop agriculture workers are practically all unskilled. Finally the industrial price deflator has greater problems of coverage and aggregation than the corresponding agricultural price deflator. But these are matters of degree. By tracking wage changes in particular industries one can get a good picture of changes in the wages of unskilled industrial workers. By comparing changes in wages in different areas one can also track the impact of growth and crisis in major industrial areas. As in the case of agricultural wages, there are plausible explanations for the changes in nominal and real industrial wages in the last 5 years. The high correlation between changes in agricultural and industrial wages also increase one's confidence that both wage series reflect reality quite well.